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INDEPENDENT BROADCAST CONSULTANTS, INC.
110 COUNTY RD. 146,
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(607) 273-2970

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August 19, 1993

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

in re: An Inquiry into the Commission's Policies and Rules regarding AM Radio Service Directional Antenna Performance Verification

MM Docket No. 93-177

Dear Mr. Caton:

On behalf of our company, we transmit herewith the original and four (4) copies of our Formal Comment in response to the Commission's Notice of Inquiry in the above-referenced matter. We understand the deadline for comments in this matter is August 20th. Therefore, in view of the fact that this comment is being hand-delivered, we trust it will be regarded as timely filed.

We stand ready to answer any further questions which may arise in this matter and to address further stages of this proceeding.

Respectfully submitted,

William J. Sitzman, Jr.
President

Encl.

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FORMAL COMMENT

in the matter of

An Inquiry into the Commission's Policies and Rules Regarding AM Radio Service Directional Antenna Performance Verification

MM Docket No. 93-177

August 19, 1993

Submitted by:
William J. Sitzman, Jr.
President
Independent Broadcast Consultants, Inc.

TABLE OF CONTENTS

Village of Trumansburg)
Tompkins County) SS:
State of New York)

William J. Sitzman, Jr,. being duly sworn upon his oath, deposes and states that:

He is President of and a consultant with the firm Independent Broadcast Consultants, Inc., with offices at 110 County Rd. 146, RFD #1, Trumansburg, New York 14886.

His qualifications are a matter record with the Federal Communications Commission, having filed numerous technical reports with them in the past which were accepted for filing and subsequently were granted construction permits.

The facts contained in this report subscribed by him are true of his own personal knowledge, except those stated on information and belief, and those facts he verily believes to be true.

Subscribed and sworn to before me this 19 day of August, 1993.

NOTARY

Notary Public, State of New York
No. 4781755
Qualified in Tompkins County
Commission Expires Sept. 30, 1993

Village of Trumansburg)

Tompkins County) SS.

State of New York)

Robert A. Lynch, being duly sworn upon his oath, deposes and states that:

He is an employee and a consultant with the firm Independent Broadcast Consultants, Inc., with offices at 110 County Road 146, Trumansburg, New York 14886-9721.

His qualifications are a matter of record with the Federal Communications Commission, having filed numerous technical reports with them in the past and having participated in other technical projects and applications which have been accepted for filing and subsequently were granted construction permits.

That facts contained in this report subscribed by him are true of his own personal knowledge, except those stated on information and belief, and those facts he verily believes to be true.

ROBERT A. LYNCH

Subscribed and sworn before me this 19th day of August, 1993.

NOTARY PUBLIC
BARBARAGUE DARRAH
Notary Public Duly Authorized
In Tompkins County 4821208
My Commission Expires March 7, 1994

Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C.

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In the matter of An Inquiry into the Commission's Policies and Rules regarding AM Radio Service Directional Antenna Performance Verification	MM Docket No. 93-177

SUMMARY

Independent Broadcast Consultants, Inc. ("IBC"), 110 County Road 146, Trumansburg, N.Y. 14886-9721 offers its Formal Comment in the Commission's Notice of Inquiry in MM Docket 93-177 regarding the policies and rules for directional antenna performance verification in the AM Radio Service. The comments presented herein are drawn from the experience and observations of IBC's engineering staff in the company's past twenty years of AM directional antenna design, construction and performance review.

This Notice of Inquiry seeks input as to what revisions may be necessary in Commission regulation to better enforce the new, more stringent AM allocation criteria enacted through Docket 87-267. It also requests input as to what regulations may have become unnecessary or outmoded because of emerging technologies or the additional financial burdens facing AM licensees. On most points raised in this proceeding, IBC contends existing procedure and standards remain sufficient at containing and reducing excessive interference, but also remain vital in certifying AM directional antenna performance. IBC maintains a ground-based measurement-intensive antenna proof-of-performance should continue to stand at the core of any performance verification system. Theoretical computer-based antenna modeling programs, while certainly helpful

in tuning an array, are at present an insufficient substitute for sound field measurement data. Unlike the theoretical models, antenna proof measurements reflect real world conditions and take into account the impact of natural and man-made objects and design characteristics unique to both the subject array and its sampling system.

IBC acknowledges certain refinements in the rules of tuning and measurement may prove beneficial and urges a flexible approach be taken by the Commission especially in cases where significant obstacles exist to valid measurement in developed areas, or where previously-obtained measurement data is unobtainable, especially in partial proofs of performance. It also suggests certain relaxation of equipment requirements for those systems designated as critical arrays.

Most importantly, however, IBC urges the Commission consider reimposition of earlier, more rigorous requirements for day-to-day monitoring and performance documentation by AM licensees. During the past decade, deregulation has led to neglect of antenna systems by control operators and engineering personnel. Many arrays operate for long periods at variance with allowed parameters either because of operational oversight or willing failure to correct known defects. Regulations need to be reimplemented to encourage better human attention to an array's daily performance and to promptly address unexpected problems. Toward this end, IBC proposes the Commission establish minimum frequency intervals for antenna monitoring by operators, monthly recording of monitor point data, and a tougher policy on the renewal of Special Temporary Authorizations.

IBC believes in AM's future and trusts its comments here will help further the service's rebirth. However, a relaxation of performance verification standards at this juncture would prove particularly unwise and would serve only to further erode AM's financial position, rather than strengthen it. It trusts the Commission agrees.

Before the

FEDERAL COMMUNICATIONS COMMISSION

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In the matter of An Inquiry into the Commission's Policies and Rules regarding AM Radio Service Directional Antenna Performance Verification	MM Docket No. 93-177

To: The Commission

FORMAL COMMENT

Independent Broadcast Consultants, Inc. ("IBC"), located at 110 County Road 146, Trumansburg, New York 14886-9721, respectfully submits the following formal comment in the Commission's inquiry into the policies and rules pertaining to the performance verification of directional antenna systems at AM Broadcast Radio Service stations. Said Notice of Inquiry, adopted June 14, 1993, seeks public comment on various Commission rules and policies which affect the tuning, measurement and performance verification of directional AM antenna systems. As stated in the Notice, the Commission seeks expert advice on potential revisions that will, *" promote the long term viability and quality of the AM Service."* More specifically, in view of the adoption of revised AM allocation standards with Docket 87-267, the Commission requests input on what revisions, if necessary, are desirable to ensure the thorough and accurate evaluation of AM antenna systems to meet the new interference criteria. It also seeks comment as to particular rules which may be redundant, outmoded or particularly burdensome upon licensees. Drawing upon the experience and observations of its engineering staff, IBC will address those regulations and policies it believes warrant change, as well as those which deserve retention. It stands

ready to offer further comment at any such time as the Commission may choose to submit a Notice of Proposed Rulemaking to formalize the suggestions of this Notice's commenters or revisions the Commission may advance at its own initiative.

COMMENTER'S QUALIFICATIONS:

For more than 20 years, Independent Broadcast Consultants, Inc. has provided professional broadcast engineering services in the design, construction, adjustment and performance verification of AM, FM and television broadcast services. Though one of the smaller engineering companies in terms of staff, its client roster over the years has numbered more than 300. Though it assists clients from time to time in the construction and maintenance of technical facilities, the vast majority of its staff time is spent in the preparation of AM and FM construction permit applications to be submitted the Commission, and the subsequent tuning and documentation of approved antenna systems, including AM antenna proofs of performance. Furthermore, despite the broadcast industry's increasing emphasis upon FM transmissions, this office's major concentration remains in the AM arena. Indeed, AM directional antenna design continues to be our specialty. Once our designs receive Commission approval, clients frequently request our assistance in tuning and adjustment, either on a direct "hands-on" basis, or indirectly through evaluating and analyzing data gathered by third party field engineers and submission of final proofs of performance. With all due modesty, we believe our firm's submissions over the past two decades have placed us in good standing with the Commission and its staff.

This comment has been prepared as a collaborative effort between the undersigned, IBC's president, William J. Sitzman, Jr. and his associate, consulting engineer Robert A. Lynch. Mr. Sitzman founded IBC in 1973 and has served continuously since that time as its president. He holds a First Class Radiotelephone Operators license and is a member in good standing with the Society of Broadcast Engineers. His specialty, like that of the company he heads, is

in AM directional antenna design. During the past 20 years, he has participated in the design and/or performance verification of more than a score of various AM directional antenna systems. Mr. Lynch, an IBC employee since 1987, has either overseen or participated in the tuning and adjustment of at least eight of these systems, and remains active in the design of several directional AM applications for future submission. Both engineers have observed many AM operations first-hand, noting those facilities' strengths and shortcomings. As such, they feel qualified to address those sections of the rules which may deserve tightening and those which may prove unnecessary. Additionally, both authors possess prior broadcast experience in the performance and management area, and have served either as previous investors in AM broadcast operations or as principals in AM broadcast applications currently pending before the FCC. As such, the authors provide perspectives outside the exclusive field of broadcast engineering and have gained a respect for the financial and regulatory realities facing today's AM operator. Perhaps more strongly than some others who may comment, IBC has a strong stake in AM Radio's future success. This company and its engineers sincerely hope that the next decade will bring a rebirth in the AM service to a level that will at least erase the erosion in profitability, program quality and listener preference the service has suffered since the 1970's.

ANTENNA PROOFS REMAIN ESSENTIAL:

Though not stated directly, the Notice of Inquiry implies through its questions the potential that the Commission may consider the future elimination or substantial relaxation of AM directional proofs of performance as requirements for station license. IBC expects some commenters in this proceeding may argue that rigorous antenna proofs as currently mandated are no longer necessary. We strongly disagree. While certain revisions may prove worthwhile to offer broadcasters and their engineers increased flexibility and the opportunity to adapt new technologies to the tuning process, IBC maintains the required procedures outlined in § 73.151, § 73.153, § 73.154, and § 73.186 remain as valid and

necessary today as when first adopted. Indeed, with the Commission's increased emphasis upon interference containment and reduction, the requirements for thorough ground-based antenna performance verification are more important than ever. We urge retention of current performance standards and procedures as a basic core requirement for the licensing of any new or modified directional AM antenna system.

As acknowledged in the Notice, petitioners to this proceeding have cited the *"significant financial burden"* which confronts many AM licensees in their attempts to comply with current performance verification procedure. But in IBC's opinion, AM Radio will fail to contain or reduce destructive interference unless rigid and verifiable standards are maintained to ensure antenna systems are in proper adjustment. To be blunt, those operators who lack the funds to build and operate directional antennas to Commission standard have no business on the air. The revised AM Rules adopted with MM Docket 87-267 provide a mechanism whereby existing unlimited-time Class B stations may reduce facilities to Class D status. (See R&O; Section III-F, § 88 & 89.) Those operators unable financially to maintain existing nighttime directional antenna systems may find facility reduction an expedient alternative. However, in the best interests of conscientious AM broadcasters and the AM spectrum's long-term viability, the integrity of antenna system performance cannot be dictated by financial convenience. Should commenters offer alternative methods whereby antenna systems can be measured, verified and monitored at reduced expense, the Commission should give those alternatives fair consideration. But any rule modifications should only be adopted after it is proven such revisions will enhance, not compromise, the goals initiated by Docket 87-267.

GROUND-BASED FIELD DATA ESSENTIAL:

The Notice of Inquiry raises questions concerning the frequent disparity between throretical and measured antenna parameters, further

inquiring which theoretical computational routines are acceptable for use in lieu of measurements. Based on its experience, IBC suggests no theoretical substitute yet exists for actual ground-based field measurements. As the Notice states, several sophisticated computer-based antenna modeling programs have been developed. But as the Notice further acknowledges, the ideal world of the computer screen does not take into account the various anomalies of the real world. Steep cliffs, power lines, even flagpoles have distorted patterns from theory for clients whose arrays we have tuned. Yes, as petitioners suggest, certain antenna adjustments to values away from theoretical hold the *potential* to inadvertently mis-tune an array at pertinent vertical angles. Nonetheless, a ground-based antenna proof is intended to direct an array's *true* parameters (as opposed to those necessarily shown on the antenna monitor) closer to theoretical, not farther from it. Standard pattern analysis provides that with a particular horizontal radiation pattern, an array should produce a particular vertical component at pertinent azimuths. Lacking measurement data at these vertical angles (a virtual impossibility in most instances), one must assume that a properly-tuned horizontal pattern generates its standard pattern equivilent off the horizon, To our knowledge, no computer model can blindly predict radiation at vertical angles without continuing to rely on pattern integrity in the horizontal plane. Certainly, computer models serve as valuable tools in array tuning. Our office has occasionally relied on such data, and so have other engineers whose work we respect. However, at this stage of technological development, ground-based field data stand as the best predictors of antenna system compliance.

Also, the Commission must understand that discrepancies between theoretical and measured field antenna parameters *as displayed on the antenna monitor* may be attributed to imperfections in the monitoring system itself. Differences in sample line lengths, sample line impedances, tower composition or cross-sectional dimensions or other factors may deviate measured monitor

values from the theoretical. Engineers have understood these factors for decades. And even the most modern and engineeringly uniform antenna system usually requires some adjustment in the field. To this commenter's knowledge, routine parameter adjustments away from theoretical to accommodate factors of this sort have not led to unexplained interference abnormalities at stations whose arrays we have adjusted. Thus, our best advice to the Commission as it deliberates potential revision in adjustment procedure continues to be that if it isn't broken, don't try to fix it.

IMPACT OF SURROUNDING STRUCTURES:

The Inquiry seeks comment at to what degree it is practical or necessary to take into account other structures in the vicinity of the array, and whether the impact of such structures can be ascertained theoretically or only through field measurement. IBC shares the opinion of various petitioners that suburban development during recent decades has complicated matters for many licensees whose arrays were once situated in essentially unobstructed rural areas. Many arrays once in total compliance with Commission standards now stand at variance with their authorizations through no direct fault of the licensees. While this problem warrants concern by the Commission, its solution defies easy answers.

IBC has observed a double standard currently exists as to circumstances under which the Commission will require the remeasurement of directional antenna systems when new man-made structures are erected. For example, in one recent instance, the Commission requested a partial proof of performance for a directional array as a condition to the erection of a 28-foot antenna mast by a non-commercial FM client more than one-and one-half miles away. However, construction of the massive academic building of nearly equal height on which that mast would rest required no partial proof. Nor does the ongoing construction of homes, factories and shopping centers much closer to the AM array. IBC understands the Commission's concern for preserving the integrity of AM antenna systems through what limited

power it possesses. Nonetheless, the Commission lacks the resources and the local first-hand knowledge to monitor all forms of potentially injurious construction nationwide, and financially-strapped licensees should not be burdened with investigating and measuring potential new re-radiators each time one is built or altered barring evidence of actual contamination through routine monitor point checks.

In our company's opinion, it would be both arbitrary and burdensome for the Commission to set particular criteria as to what sizes and types of non-broadcast man-made structures mandate array remeasurement. At the same time, however, antenna systems thrown out of adjustment by new surrounding structures should not be allowed to continue at variance with their authorizations for years or even decades. Monitor point compliance with licensed limits is a rough gauge of pattern integrity, but fails to provide adequate information at other bearings from the array. Prior to deregulation, the Commission routinely required directional AM antenna licensees to undertake partial proofs of performance at least every three years as a requirement for license renewal. Through such a requirement, defects in antenna system integrity, sampling system accuracy, or circumstances in the man-made environment could be identified and addressed on a regular basis. Said requirement no longer exists. IBC suggests as a fair compromise to balance the interests of interference containment with the financial realities of AM broadcast operation that the Commission reinstate its requirement for periodic partial antenna proofs. For antenna systems remaining in compliance, such proofs are quick, relatively inexpensive, and can generally be accomplished by in-house or contract maintenance engineers. The time interval between such regular measurements remains open for discussion. However, IBC suggests remeasurement be mandated no more often than once every three years, nor less often than once every seven. Perhaps five year intervals could serve as an equitable compromise. Commission staff would need not be burdened with review and analysis of partial proof data. However, the report could be retained in the licensee's public file for inspection.

This office recoqnizes highly-developed urban and suburban areas pose unique challenges for directional AM broadcasters and the engineers charged with their arrays' tuning and adjustment. In such instances, IBC urges the Commission offer expanded flexibility in the gathering and/or presentation of documentation data. As stated earlier, a ground-based antenna proof should remain the core requirement. However, the Commission should look favorably upon creative means to expand the documentation process when necessary, provided such is founded on sound engineering logic. For example, we are familiar with one antenna tuning project in the highly-developed New Jersey meadowlands in which certain key radials were measured for more than 50 miles to substantiate accurate inverse fields. As technology advances, certain forms of aerial measurement at precise vertical angles above the horizon may be obtained with sufficient accuracy to provide a better picture of array performance than may be possible at ground level. Rather than incorporate such innovative procedures into the Rules at this time, IBC recommends the Commission continue its present policy of openness to supplemental engineering showings as needs dictate.

GREATER DAILY OVERSIGHT NEEDED:

The Notice inquires as to what types of AM antenna instrumentation are appropriate, where such instruments should be placed, and how frequently they should be monitored. In IBC's opinion, the area of periodic human oversight is that in which reform is most urgently needed to further the interests of interference containment and reduction. The quality and sufficiency of existing measurement instruments is generally not a problem at today's stations *providing such equipment is properly maintained.* Nor does our experience indicate current allowances for periodic pattern deviation are too lenient. Rather, the most serious problems at potentially interfering AM stations today relate to human ignorance and/or negligence. Based on our inspection of both client and non-client stations, pattern deviations from accepted standards tend to arise when

arrays are allowed to drift aimlessly without day-to-day (or even month-to-month) attention; or when presumed equipment defects are identified, but not corrected, for months or years at a time.

In the spirit of deregulation during the past decade, operators at the control point of most stations are no longer required to take regular and accurate antenna monitor readings; and systematic monitor point measurement is no longer mandated as a maintenance requirement. IBC respects those Commissioners, both past and present, who sought to eliminate needless regulatory burdens upon licensees. However, the record during the intervening years has sorely demonstrated that reliance upon the licensee to police itself in this area has failed. At least a significant minority of directional AM stations today essentially operate on autopilot, at least as far as their arrays are concerned. Many inexperienced disc jockeys or control board operators don't even know how to measure or log antenna parameters. Many others simply don't bother. And the growing trend toward contract maintenance, often dictated by financial necessity, allows antenna problems to persist for days or weeks until the once-a-week contract engineer finds time to study the problem. IBC respects the need of station owners to control costs. But more often than not, what's needed is not more expense, but greater accountability. Operators already on staff should be required to log accurate parameter readings on an established schedule. The chief operator or his/her engineering designee should review such readings on a systematic basis. Monitor points should be read regularly. And any deviations from allowed tolerances should be corrected as soon as possible.

IBC recommends a limited return to some of the regulatory practices which succeeded in keeping arrays in better adjustment 20 years ago. We recommend the Commission establish a minimum frequency for logging of antenna parameters. During directional operation, we believe such readings should be taken at least every three hours. Mandated monitor point readings for all

directional stations should be monthly, with appropriate maintenance log entries denoting compliance. Any additional adjustments by the chief operator or engineer should also be noted. Said logs should be retained for official inspection.

As stated in our company's Formal Comment in the Notice of Proposed Rulemaking in MM Docket 87-267, we have observed in recent years a general abuse of the policy of Special Temporary Authorizations (STA's) for AM directional arrays with patterns at variance. STA's serve a useful purpose in allowing licensees reasonable opportunities to correct unexpected problems with antenna systems or to allow new antenna construction and alteration. But for some subject stations, the STA process has evolved into a mechanism for delay. Instead of addressing a defect or rebuilding an aging (or even demolished) array, some operators merely seek one STA after another. We urge the Commission study placing finite time limitations upon STA extension and demanding increasing rigorous justification for extensions beyond the time frame reasonably expected to facilitate repairs.

PRECISION OF MONITORING TOOLS:

Based upon its experience in the field, IBC's opinion of modern type-approved directional AM sampling systems is good. And we see no worthwhile reason to substantially alter the existing provisions of § 73.68. However, there exists one element of the Rules which our staff observes has proven burdensome to some licensees. And this involves the equipment requirements for critical AM directional arrays. Present regulation requires those who build or inherit such critical arrays to purchase specialized and often expensive supplemental monitoring gear to safeguard their stations from parameter deviations beyond specified limits of less than three degrees phase or five per cent relative current. While such apparatus may be helpful in a licensee's oversight, it may not always be essential to the ensuring of proper compliance. Accordinly, we urge the Commission to study the potential for relaxing or even eliminating the

specialized equipment requirements of current rules. As stated previously, IBC believes current problems arise not so much from imprecise measuring tools, but rather from the licensee's reluctance to read them. For example, for many critical arrays, properly calibrated analog antenna monitors when properly read will produce data with sufficient reliability as compared to digital devices. We suggest that operators of critical directional arrays be required to employ a greater *frequency* of monitor measurement (perhaps once every hour during critical array periods.) Also, in lieu of precision antenna deviation monitors, said stations could document retention of a full-time or regular part-time (at least five daily visits per week) chief engineer to inspect logged readings and implement necessary corrective action.

FIELD MEASUREMENT ROUTINE:

Current provisions of the Rules specifying recommended intervals of measurement have served the industry and the Commission well. And IBC sees no need for immediate change. However, as with other issues addressed in this Notice of Inquiry, the authors believe certain additional flexibility does no harm so long as it does not compromise the quality of documentation.

Traditional radial measurement requirements have specified that beyond an antenna's induction field (or that distance on a directional array beyond which the pattern can be assumed properly formed), measurements should be taken at least once every one-tenth mile (or its metric equivalent) for the first two miles; approximately every one-half mile from two-to-seven miles; and approximately every two miles from two-to-20 miles. Generally, such measurements have produced good data sufficient to identify both a radial's inverse field and soil conductivity. For antenna proofs of performance, both criteria are essential. And though "close-in" measurements (often done by foot) can prove the most burdensome for many engineers, such close-in data is often the most valuable in substantiating the actual inverse field. Of course, there may exist circumstances,

particularly in developed areas, where close-in data fail to generate reliable results. In such instances, Commission practice allows greater weight to be placed on more distant points. In general, staff have allowed engineers considerable latitude in adapting measurement procedure to meet specific local conditions. We encourage this practice to continue. If any modification of existing rules is deemed necessary, IBC recommends the Commission consider relaxing the specific distance-related dictates to a more general stipulation that measurements be numerous enough and in sufficient proximity to the antenna system so as to accurately determine inverse field and pertinent soil conductivity. Also, in view of the observation that close-in measurements are often more meaningful than those at a greater distance, we encourage the Commission to consider waiving the requirement for antenna proof field measurements beyond the 16 kilometer (10 mile) distance *providing inverse fields and conductivities can otherwise be verified.*

§ 73.154 provides criteria for partial antenna proofs of performance and dictates that field measurements be obtained for at least ten points (including the designated monitor point, when applicable) within a two-to-ten mile (3-16 km.) distance. IBC has observed this limitation often proves overly rigid in actual practice. Terrain frequently limits the number of valid measurement points over this limited span, as does development that often occurs since a station's last full antenna proof. In one recent case handled by our firm, certain radials beyond one or two miles from the array fell entirely over open water. In such cases, precise remeasurement can prove unnecessarily burdensome or inexact. Typically, the Commission's staff has been quite lenient in allowing case-by-case flexibility. We encourage this policy to continue. And should § 73.154 be amended, its revisions should include provisions which acknowledge that partial proof measurements may be required at distances less or greater than the 3-16 kilometer limit, or that under certain conditions, new measurement points may prove necessary to replace those obscured or made inaccessible since the last full antenna proof.

CONCLUSION:

Independent Broadcast Consultants, Inc. believes in AM's future. And with the right ingredients, including better-quality receivers, first-class programming and reduced interference, we maintain AM holds the potential to regain its former glory. But a fundamental element toward attaining this goal falls squarely upon AM broadcasters themselves to keep their facilities up to standard and in total compliance with their authorizations. We do not feel present regulations pertaining to antenna tuning and performance verification impede AM significantly in its rebirth. However, significant compromise of the established standards could seriously thwart that effort. Additionally, we argue that reimposition of certain limited monitoring and documentation requirements could assist measureably in the service's revitalization. We trust the Commission and the industry will share our encouragement and move forward toward better serving conscientious AM broadcasters and the American public.

August 19, 1993

William J. Sitzman, Jr.
President

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